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(54) Abstract Title
An electrical connector

(57) An electrical connector is provided for connecting a computer to a power source. The electrical connector includes additional power outlets (13, 14, 15) for supplying power from the power source to computer peripherals, e.g., monitor (not shown). The electrical connector comprises a current sensor (3) for sensing current flow to the computer and a relay contact (7) which couples the additional outlets (13, 14, 15) to the power source only when the current sensor senses a current flowing to the computer. An overload protection circuit (6) is also provided to block power to the additional outlets (13, 14, 15) when overloaded.

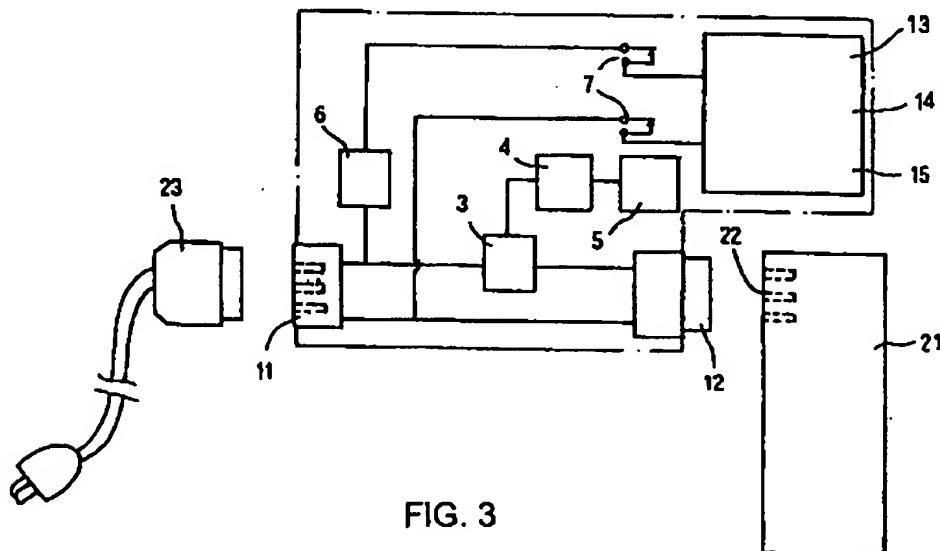


FIG. 3

At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

This print takes account of replacement documents submitted after the date of filing to enable the application to comply with the formal requirements of the Patents Rules 1995

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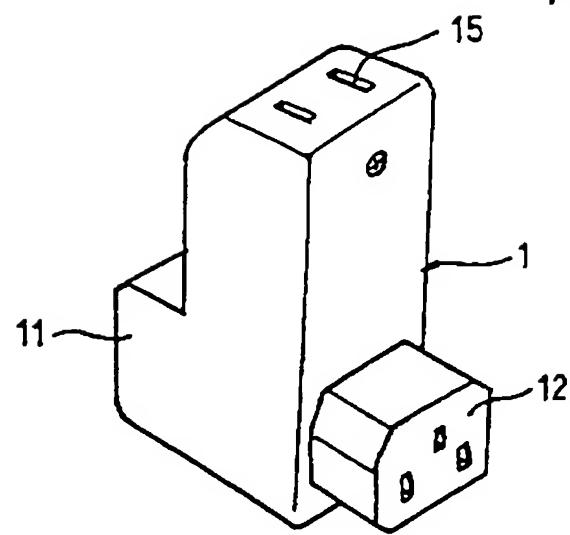


FIG. 1

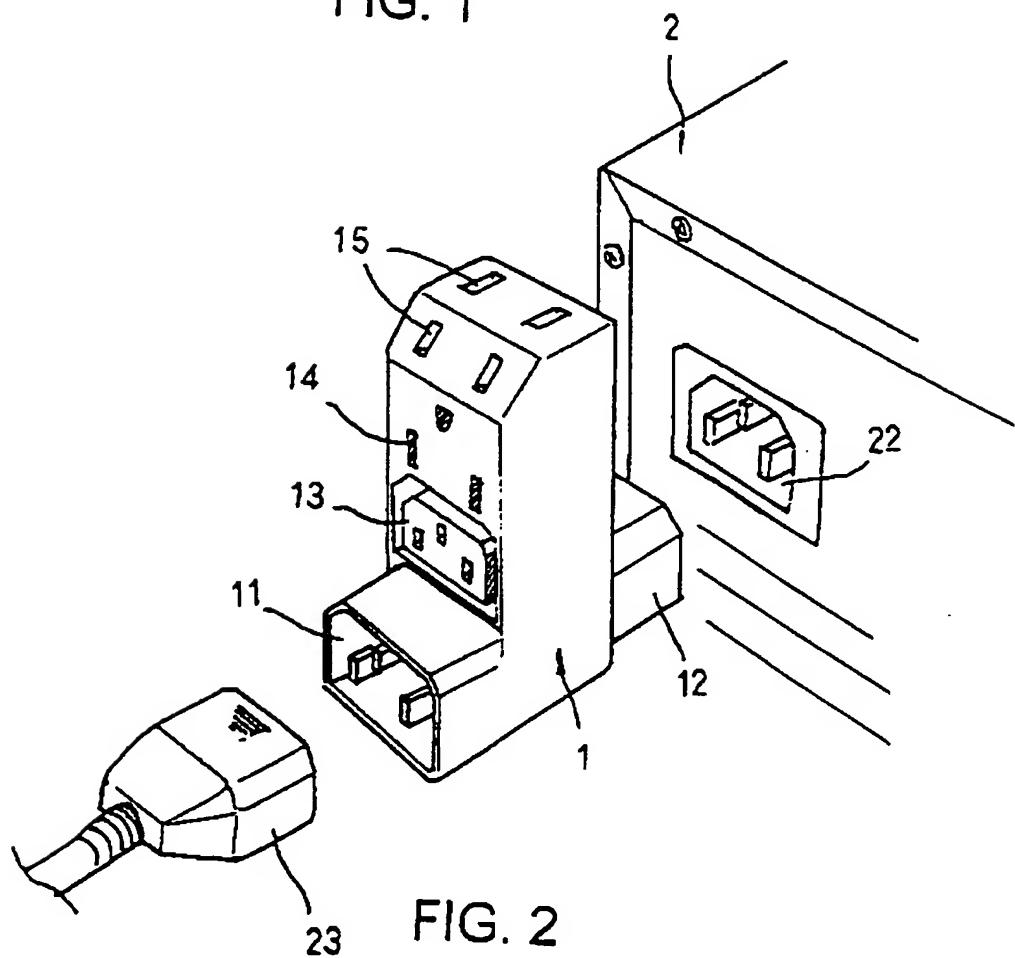
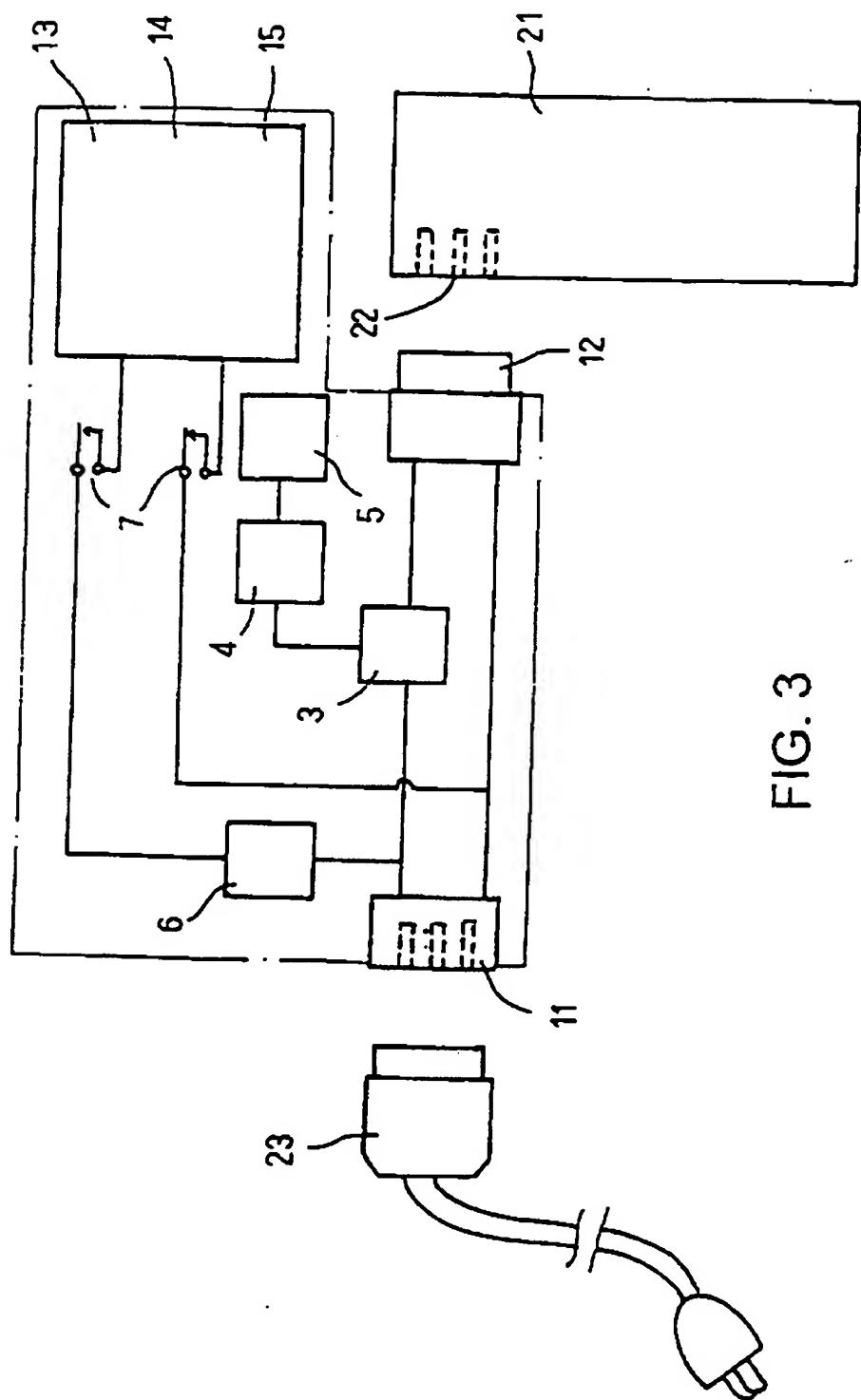


FIG. 2

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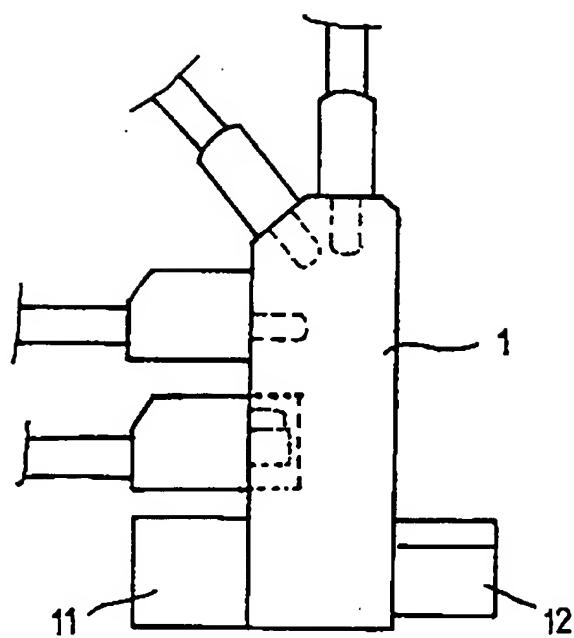


FIG. 4

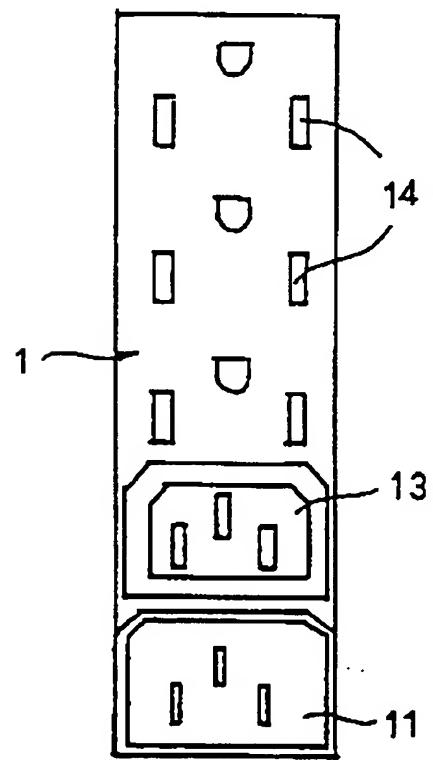


FIG. 5

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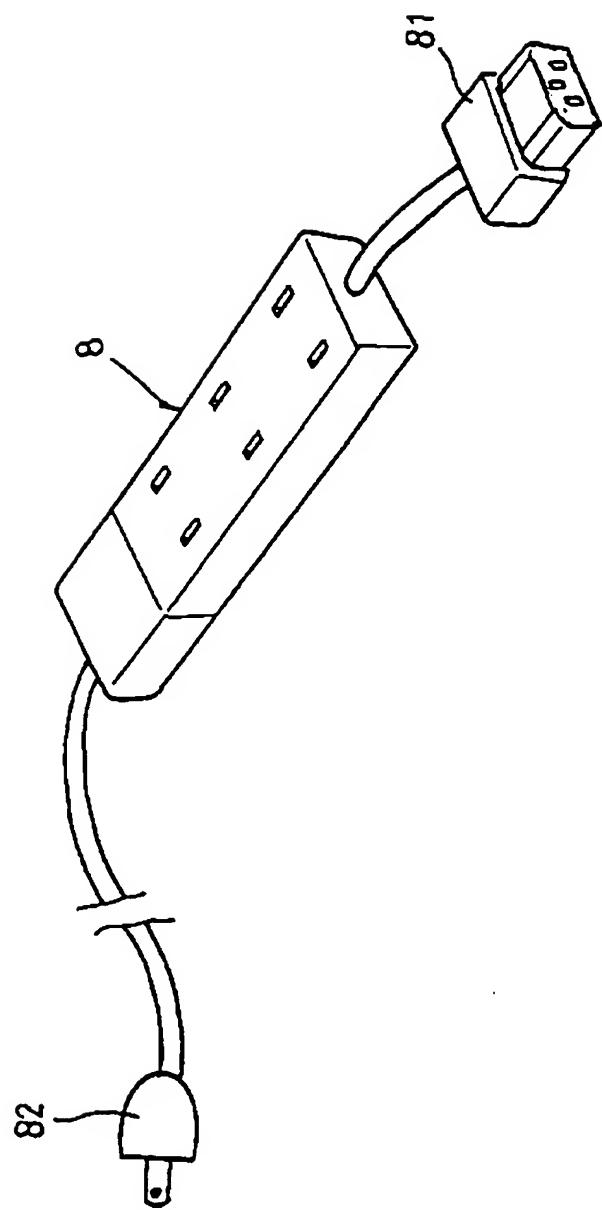


FIG. 6

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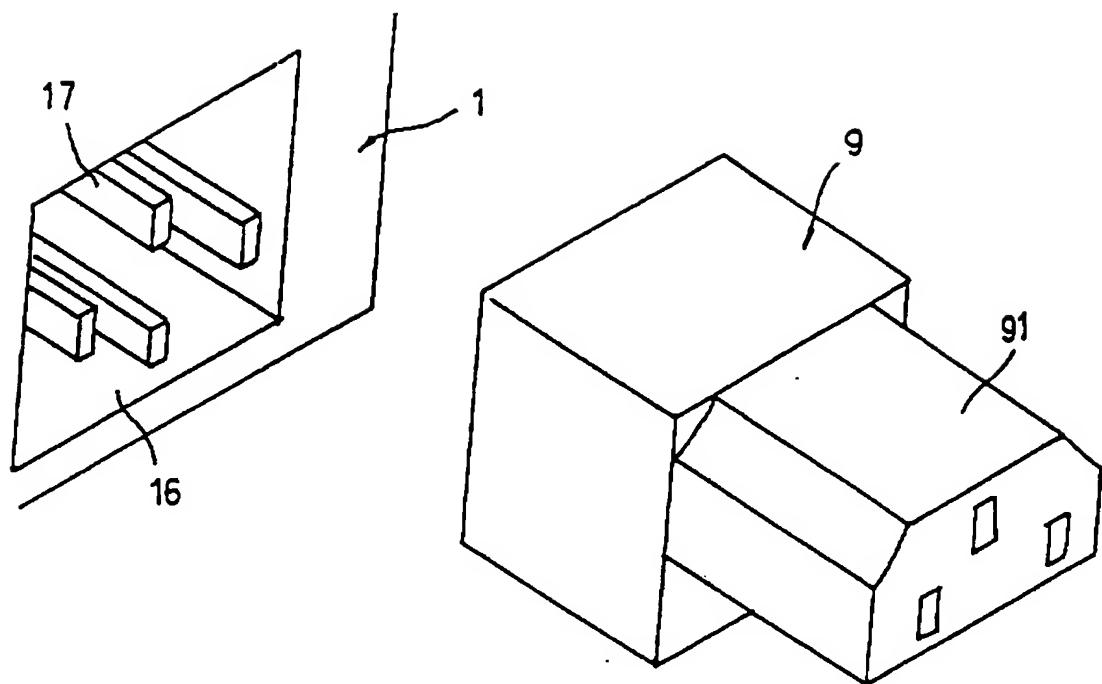


FIG. 7

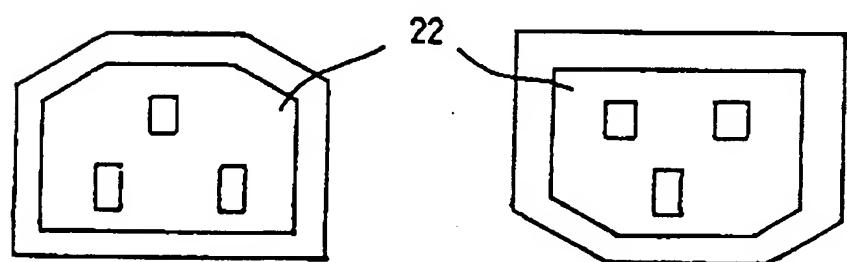


FIG. 8

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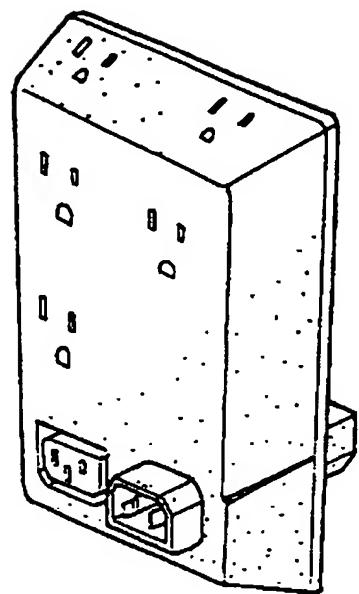


FIG. 9

Field of the Invention

The present invention relates to an electrical connector, more particularly,

- 5 to a power supply socket having automatically controlled on/off function by which the power supply to the peripherals of the computer can be readily controlled by the computer. Accordingly, the ATX or NLX models which are the advanced models and can be switched on/off directly through the software or net. By this arrangement, the computer and its peripherals can be simultaneously and directly
- 10 powered on through the software or manually operated manner. As a result, a simplified operating procedure and power saving can be attained.

Description of Prior Art

The conventional and existing personal computers are AT series in which the power supply of the computer is provided with a main receptacle for receiving

- 15 external power supply and a monitor receptacle for plug of the monitor. The power supply to the monitor is controlled by the switch on/off of the host computer.

However, this existing power supply is not suitable for the application of the workstation, such as Window 95, and which is provided with "software power on/off". In this newly developed workstation, it can be automatically powered on/off by the user and directly through the internet. In order to meet the new requirements, newly developed series ATX or NLX series have been provided. Although the power supply of the ATX, NLX, PS/2, and MAC has been managed intellectually, i.e., the power on/off can be controlled by the software or the rings of the modem. However, the power supply used thereon has merely a single receptacle thereon for power cord. As a result, there is no other receptacle to seat the monitor plug. Consequently, the monitor can not be simultaneously powered on/off with the host computer. Furthermore, the personal computer is also

connected with other peripherals, such as the speaker, printer, M/O, scanner and which can not be simultaneously controlled. Once the host computer is switched, those peripherals shall be switched off one by one. This is really inconvenient to the end user. Because the host computer can be suitable switched off by the 5 software, the user may often forget to switch off the power of the peripherals. As a result, an unnecessary power waste will be occurred. This is really not a good design.

There is a desire to provide an intellectual power supply socket which can be readily installed to the power outlet of the host computer.

10 According to the present invention, there is provided an electrical connector as defined in claim 1. Preferred features of the present invention are defined in the dependent claims to which reference should now be made. The electrical connector or power supply socket may be configured with a plurality of receptacles by which a plurality of plugs of the peripheral can be plugged on for power supply. 15 Consequently, the power on/off of the peripherals may be readily and centrally controlled. As a result, the man power may be reduced, the electrical power may be saved via the automatic management. The power saving function of the computer may be readily attained.

According to one aspect of the present invention, a simplified connection is 20 attained through the connecting socket or an extended socket. As a result, the user may readily arranged the power supply for both the host computer and the peripherals. The space used for these facilities can be readily made while no excess space required.

According to another aspect of the present invention, wherein the 25 controlling socket is provided with an overload protecting device. Not only will the host computer and its peripherals be centrally and simultaneously controlled, but also will prevent an overload resulted from those peripherals.

Brief Description of Drawings

In order that the present invention may more readily be understood the following description is given, merely by way of example with reference to the 5 accompanying drawings, in which:

Figure 1 is a perspective view of the power supply socket made according to the present invention;

Figure 2 is a schematic and perspective view of the power supply socket attached to the host computer;

10 Figure 3 is a circuitry of the power supply socket;

Figure 4 is a schematic illustration showing the plugs of the peripherals are plugged on thereof;

Figure 5 is still a schematic illustration showing the top of the power supply socket is provided with a plurality of receptacles;

15 Figure 6 is a perspective view of the second embodiment of the power supply socket;

Figure 7 is an exploded perspective view of the power supply socket in which an adaptor is incorporated for different plugs; and

20 Figure 8 is a schematic illustration of the socket of the power supply disposed at the rear panel of the host computer.

Figure 9 is a perspective view of another embodiment of the power supply socket.

Detailed Description of Preferred Embodiment

25 Referring to Figure 1, the power supply socket is specially designed for the ATX or NLX models of the computer in which the power supply 21 is provided with only one receptacle 22. By the provision of the present invention, not only can the power supply 21 be connected to the external power supply, but also may

provide operational power to monitor and the peripherals. By this arrangement, the peripherals and the host computer can be directly controlled via the software or through the host computer. The power supply socket 1 is generally configured with a L-shape housing having a main receptacle 11 having three slots, 5 i.e. hot slot, neutral slot and ground slot. A main three-blade plug 12 is disposed at the opposite side of the L-shape housing. The side portion of the L-shape housing of the socket 1 is provided with a monitor receptacle 13 and a plurality of receptacles 14 which are all provided with ground slot. The top of the L-shape housing is provided with a general receptacle 15 having only a hot slot and a 10 neutral slot.

Referring to Figures 2 and 4, the main plug 12 of the socket 1 can be readily inserted into the receptacle 22 of the power supply 21 of the host computer. Afterward, the power cord of the host computer can be readily plugged into the main receptacle 11 of the socket 1 such that both the power 15 supply 21 and the socket 1 are supplied with electrical power. Afterward, the user may attach the plugs of the peripherals sequentially on the suitable receptacles 13, 14 and 15. For example, the plug of the monitor can be plugged onto the monitor receptacle 13, and the speaker, printer, M/O, scanner can be selectively plugged into the receptacles 14 and 15.

As shown in Figure 3, a detailed circuitry disposed within the socket 1 is disclosed. Except the circuit for the main receptacles 11 and the main plug 12, a current sensor 3, an amplifying and triggering circuit 4 and a relay 5 are connected to the circuit. A relay contact 7 is further connected in serial on the circuit by which the power supply to those receptacles 14 and 15 of the socket 1 25 can be readily controlled. An overload protecting circuit 6 is further provided between the relay contact 7 and the receptacle 11.

By this arrangement, as shown in Figures 2 and 4, after the main plugs of the peripherals are completely seated and the computer 2 is powered on. The

current sensor 3 may detect a current since there is a load and then send a signal such that the current can be amplified by the amplifying and triggering circuit 4. Afterward, the relay contact 7 will be closed as actuated by the relay 5 and those receptacles 14 and 15 can be supplied with power. Accordingly, those 5 connected peripherals are also provided with electric power for normal operation. When the host computer 2 is switched off manually or by software, the current sensor 3 will not detect a current since the load from the power supply 21 is removed. Consequently, the amplifying and triggering circuit 4 will disable and the relay 5 is opened accordingly. As a result, the power supply to the 10 receptacles 14 and 15 is interrupted and the peripherals are switched off accordingly. By this arrangement, via a single operation, the host computer 2 and the peripherals can be simultaneously switched off without switching one by one.

In order to prevent an overload of the socket 1 resulted excess power 15 exhausted by the peripherals and which may raise an overload or sparking, the socket 1 is well protected by a overload protecting circuit 6. By this arrangement, when an overload is encountered, the power supply to the peripherals will be automatically blocked by the overload protecting circuit 6. As a result, the host computer 2 and the peripherals can be well protected and 20 free from any fetal or permanent damage. By this provision, the power supply to the peripherals is independently from the power to the power supply 21 of the host computer 2. The host computer 2 can be therefore well protected.

Referring to Figure 5, another embodiment of the socket 1 made according to the present invention is disclosed. In this feasible embodiment, those two-slot 25 receptacle 15 are replaced by three-slot receptacles 14. As a result, the application can be suitable expanded.

Referring to Figure 6, the socket 1 embodied in a L-shape housing can be modified into a socket 8 having an elongate housing or an elongate housing

having an extending cord. In this embodiment, the extended socket 8 includes a typical plug 82 which can be seated into a two-slot receptacle and a special plug 81 for receptacle 22 having three connecting blades. The inner configuration of the socket 8 is identical to the socket 1. Accordingly, the user may control the 5 host computer and the peripherals in a more efficient way and the power supply to the peripherals can be simultaneously controlled.

Referring to Figures 7 and 8, because there are many a maker for power supply 21 of the host computer 2. Accordingly, the connection of the receptacle 22 can be divided into Y-type (right of Figure 8) and delta-type (left of Figure 8). 10 In order to facilitate an easy mounting of the plug 12 of the socket 1 to the receptacle 22, the plug 12 of the socket 1 is designed to have an adaptor 9 which can be readily modified to meet the Y-type or delta-type receptacles. The adaptor 9 is provided with a post having a square cross section. The square post can be inserted into the receiving hole 16 of the controlling panel such that it can 15 be electrically connected with the conductive leg 17 within the receiving hole 16. The other side of the adaptor 9 is configured with a plug 91 which can be seated into the delta-type receptacle 22. When a Y-type receptacle 22 is encountered, the adaptor 9 can be pulled upward and then rotated through 180 degrees. Afterward, the adaptor 9 can be pulled backward such that the plug 91 can be 20 seated into the Y-type receptacle 22. By this arrangement, the adaptor 9 can be readily seated onto the receptacle 22 of both delta or Y types.

Referring to Figure 9, this shows alternate form of the present invention, in which the power supply socket having automatically controlled on/off function has two rows of electric outlets arranged in parallel for providing electricity to 25 multiple peripheral apparatus.

While particular embodiment of the present invention has been illustrated and described, it would be obvious to those skilled in the art that various other changes and modifications can be made without departing from the spirit and

scope of the invention. It is therefore intended to cover in the appended claim all such changes and modifications that are within the scope of the present invention.

CLAIMS

1. An electrical connector for connecting electrical apparatus to a power source, comprising:
 - 5 means for connecting the electrical apparatus to the power source, the connecting means including a power outlet for supplying power to the electrical apparatus;
 - 10 a body having at least one additional power outlet for supplying power received from the power source to other electrical apparatus;
 - 15 2. a current sensor for sensing current flow from the power source to the said electrical apparatus; and
 - means for coupling the at least one additional power outlet to the power source in dependence upon the current sensor sensing current flow to the said electrical apparatus.
- 15 2. An electrical connector according to claim 1, further comprising an overload protection circuit which decouples the at least one additional power outlet from the power source when the at least one additional power outlet is being overloaded.
3. An electrical connector according to claim 1 or 2, in which the 20 connecting means are selected from the group consisting of a plug and a socket.

4. An electrical connector according to any one of claims 1, 2 or 3, in which the coupling means couples the at least one additional power outlet to the power source when the current sensed exceeds a threshold value, and decouples when the current sensed falls below the threshold value.
5. An electrical connector substantially as hereinbefore described, and as illustrated, with reference to the accompanying drawings.
6. An electrical system comprising first electrical apparatus and second electrical apparatus, the first and second electrical apparatus being connected to a power source with an electrical connector according to any one of claims 1 to 5, the second electrical apparatus being connected to the at least one additional power outlet of the electrical connector housing.
7. An electrical system according to claim 6, in which the first electrical apparatus is provided with software-implemented power on/off.
8. An electrical system substantially as hereinbefore described and as illustrated with reference to the accompanying drawings.

9. A power supply socket having automatically controlled on/off function of the type which includes a socket configured with a L-shape housing, said socket being provided with three-slot receptacles, three-blade plug and a plurality of 5 receptacles, said L-shape housing being further provided with a current sensor, an amplifying and triggering circuit, a relay, an overload protecting circuit, a relay contact, characterized in that:

10 said socket is configured with a L-shape housing which is provided with a main three-slot receptacle at one side of the lower portion, a main three-blade plug being disposed at the other side and which can be connected with a three-slot receptacle, said L-shape housing being further provided with a monitor receptacle, a plurality of three-slot receptacles and a plurality of two-slot receptacles;

15 said three-slot receptacles and said three-blade plug being connected in parallel and the connecting circuit being further connected with a current sensor, an amplifying and triggering circuit and a relay in serial, a relay contact being disposed between said three-slot receptacle and said receptacles disposed at top of said L-shape housing, an overload protecting circuit being disposed between said relay contact and said main three-slot receptacle;

20 wherein when those above described components are completely and integrally assembled, said main plug of said socket can be readily seated into the receptacle of the power supply of the host computer, the power cord can be also seated into said main receptacle of said socket such that said three-slot receptacles and said two-slot receptacles and the peripherals connected thereof 25 are supplied with operational power, wherein the circuit disposed within said housing may automatically detect the power on/off of said host computer and the power supply to said three-slot and two-slot receptacles can be automatically connected or blocked and the power supply to said peripherals can be centrally

and simultaneously controlled.

10. A power supply socket having automatically controlled on/off function as recited in claim 9, wherein said two-slot receptacles can be completely replaced
5 with three-slot receptacles to increase the application ranges.
11. A power supply socket having automatically controlled on/off function as recited in claim 9, wherein said socket can be configured to have an elongate housing or an elongate housing having an extending cord, said socket is provided with a male three-blade plug and a two-blade plug at the other end, said socket is
10 provided with inner circuitry such that the receptacles disposed thereon are suitably and efficiently supplied with power.
12. A power supply socket having automatically controlled on/off function as recited in claim 9, wherein said main plug is provided with an adaptor which can be readily modified to seat into a delta-type or Y-type receptacle, a square post
15 being provided at one side of said adaptor and which can be electrically connected with a conducting leg within a receiving hole of said socket when said square post is inserted, the other side of said adaptor is configured to be seated into the receptacle of delta-type or Y-type.
13. A power supply socket having automatically controlled on/off function as
20 recited in claim 9, wherein said socket can have two rows of electric outlets arranged in parallel for providing electricity to multiple peripheral apparatus.



**The
Patent
Office**

Application No: GB 9810684.2
Claims searched: 1-13

Examiner: A J Rudge
Date of search: 30 September 1998

**Patents Act 1977
Amended Search Report under Section 17**

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.P): H2E(ECAF,ECSH,ECSZ)

Int Cl (Ed.6): H01R-13/70;13/713;25/00

Other: Online -WPI

Documents considered to be relevant:

Category	Identity of document and relevant passage		Relevant to claims
X	GB 2 296 140 A	(Fujitsu) - see claim 1 and Figs.	
A	US 5,272,587	(Wan)	
A	US 4,659,161	(Holcomb)	

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